

## RICERCHE

# Descartes' Emotions: From the Body to the Body

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Ricevuto: 30 ottobre 2016; accettato: 20 marzo 2017

**Abstract** Emotions are currently at the center of a lively international and interdisciplinary debate. The first sections of this essay present a synthetic overview of its key features. The main sections provide a re-examination of one of the most historically significant developments in the field of affective studies. René Descartes' approach to the study of emotions implies a positive assessment of the role of the body and a remarkable attenuation of his classical dualism that allows an innovative perspective on the subject. He inaugurated a new scientific style of research, which is one of the original sources of some key concepts of the current research.

**KEYWORDS:** Emotions; René Descartes; Embodied Cognition; Classification of Emotions; Philosophy of Emotions

**Riassunto** *Le emozioni di Descartes: dal corpo al corpo* – Le emozioni sono attualmente al centro di un dibattito internazionale e interdisciplinare molto vivace, di cui la prima sezione del saggio presenta una panoramica sintetica. La sezione principale propone un'analisi critica di uno dei passaggi storicamente più significativi nel campo dello studio dei fenomeni emotivi. L'approccio di Descartes al tema delle emozioni presuppone una considerazione positiva del ruolo del corpo e una notevole attenuazione del dualismo per cui è noto, consentendo così una prospettiva innovativa al tema. Descartes inaugura un nuovo stile di ricerca che è alle origini di alcuni concetti chiave della ricerca contemporanea.

**PAROLE CHIAVE:** Emozioni; René Descartes; Conoscenza incarnata; Classificazione delle emozioni; Filosofia delle emozioni



EMOTIONS PLAY A PIVOTAL ROLE in our lives, profoundly influencing their quality and overall meaning. Over the centuries, human emotions have been discussed by many of the greatest philosophers – from Plato, Aristotle and the Stoics up to Descartes, Spinoza, Hobbes, Hume, Kant and James – all of whom developed various sophisticated theories to explain how a person's emotions reflect the po-

tential responses to salient events in their lives.

During the first decades of the Twentieth century, the primacy of reductionist scientific paradigms led to a sharp decrease in interest in the theory of emotion; however the topic has recently regained a central place in the fields of philosophy, cognitive sciences and neurosciences, and is currently the focus of numerous research programs. This renewed

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academic interest has spurred a lively international debate that has clarified, among other things, how a satisfactory understanding of the emotions cannot be achieved from a single disciplinary perspective.

This essay focuses on the topic from both a historical and a theoretical point of view. The first section examines some of the key features of the current debate on the emotions that are of particular relevance to my approach, such as their cognitive value, and questioned universal meaning. The main section provides an historical analysis of some of the most significant developments in the field of affective studies, such as the shift from "passions" to "emotions" and the complex mind-body relationship. These new scenarios originated in the seventeenth century, particularly in connection with René Descartes, who not only devised a revolutionary philosophical method in traditional areas such as metaphysics, physics, mathematics and physiology, but also developed a completely innovative approach to the study of the emotions, which he considered from an essentially scientific point of view: «*en physicien*».

My thesis is that by recovering and reinterpreting the perspectives developed by Descartes we can enrich the current debate on emotions and their bodily expression. The unique dialogue that he established with the natural sciences is of particular relevance to current research debates, which often question the epistemological premises of studies on the emotions. It is also hoped that a historical survey may provide a much-needed antidote to today's all too common uncritical acceptance of the perspectives and terminology of current academic research. In other words, the history of ideas can provide very useful tools with which to avoid the danger of "presentist" methodological assumptions that underestimate the original sources of some key concepts.

## ■ The contemporary debate I: Feeling and appraisal theories

Recent studies<sup>1</sup> have identified some of

the main questions that need to be addressed by the affective sciences. Among them, two seem to be crucial: the first concerns their nature or "what the emotions really are", a question that entails ontological as well as empirical issues and has significant repercussions on their possible classification. In a nutshell, the question can be summarized as follows: should we regard emotions as feelings or appraisals?

The so-called feeling theories conceive emotions as affective states, which are essentially feelings that differ from sensations or perceptions because of their subjectively experienced quality. One of the earliest proponents of this view, William James, re-evaluated the role of the body in a famous article published in *Mind* (1884), characterizing emotions as by-products of processes that take place in the autonomic nervous system. According to James, emotions are feelings triggered by the bodily changes caused by certain stimuli: we do not «cry, strike, or tremble, because we are sorry, angry, or fearful, as the case may be» but «we feel sorry because we cry, angry because we strike, afraid because we tremble [...] Bodily changes follow directly the perception of the exciting fact and our feeling of the same changes as they occur IS the emotion».<sup>2</sup> While this provocative view was severely criticized in the first decades of the twentieth century, it has recently attracted new interest, especially in the light of the crucial new insights provided by the neurosciences.

The so-called appraisal theories, by contrast, rest on the hypothesis that emotions are essentially intentional events, cognitive states. Emotions are necessarily "about something", in the sense that they are evaluative judgments, or "appraisals"<sup>3</sup> that refer to our well-being and assess the significance of the situations we find ourselves in: are they threatening and harmful, or beneficial and rewarding, for our body and mind? If emotions are appraisals, they belong to the realm of intelligent thought and action, like other cognitive events, and are not alien influences that affect

and overpower our rational will. Therefore, reason and the emotions are not contradictory and conflicting powers of mind.<sup>4</sup>

### ■ The contemporary debate II: Are emotions natural kinds or social constructs?

Another hotly debated contemporary question is how we learn and identify emotions. Should we regard emotions as natural (kinds), i.e. universally recognizable phenomena, or should we conceive them as cultural constructs and, therefore, analyze them only within the context in which they take place?

From an epistemic point of view, emotions can be regarded as natural kinds, i.e. objects that we can interpret from a scientific point of view and that we classify following the same methodology as we would use for any other kind of natural object. The “basic emotion approach”, also known as the standard approach, is grounded in the belief that certain categories of emotion reflect universal biological states, and are triggered by dedicated neural circuits preserved by evolution (the so-called affect programs), expressed by unambiguous bodily and facial behaviors, and accompanied by subjective feeling and instrumental action.<sup>5</sup> Darwin’s thesis in *The Expression of Emotions in Man and Animals* (1874) is still accepted by most scholars, who believe that expressions of emotions are universal events, which can be recognized cross-culturally, and also characterize some animal species.<sup>6</sup> Faces display emotional information for everybody to read, just like a word on a page. Accordingly, classifications are based on a precise set of fundamental (discrete) emotions – such as fear, anger, surprise, disgust, happiness, and sadness – which are shared by humans and animals and are usually distinguished by the following features: quick onset, automatic response, low awareness, brief duration, physiological changes, specific and classifiable expressions.<sup>7</sup>

The main objection raised by anthropologists and psychologists is that different cultures often express emotions in different

ways (they have different “display rules”), both with regard to their bodily expression and from a linguistic point of view.<sup>8</sup> Recent cross-cultural surveys claim that a universalistic perspective is untenable and rigid classification useless. The basic assumption is that emotions form a continuum and that discrete boundaries between them are therefore arbitrary.<sup>9</sup> Moreover, the fact that it is difficult, if not impossible, to translate exactly many of the terms that describe specific emotions into different languages reflects the metaphysical nature of the idea of a “transparent” language. From this perspective, emotions and their expressions can only be adequately understood within the original context in which they originate, and can only be studied as social constructions, which are strictly linked to specific, cultural categorizations. A dilemma remains, however: how can we speak of emotions without a shared language? Some scholars have developed a new approach, taking cultural diversity into account but also allowing the possibility that some “emotional universals” can be established.<sup>10</sup>

These contemporary debates have attracted wide interest and are far from settled: universalistic approaches, while supported by a number of strong arguments, are also subject to some well-founded objections. I believe that some of the main issues of this innovative debate find their roots in seventeenth-century philosophy and science and that, as I will show in the following sections, a re-examination of these historical precedents can significantly enrich our own approach.

### ■ A “passionate” Descartes?

The stereotype of Descartes is that of the quintessential rationalist and dualist philosopher, whose scientific interests were remote from the world of emotions. His mechanistic approach does not seem appropriate for the affective sciences: it appears inadequate to explain the close interaction between body and mind that is generally assumed in research to-

day. Some contemporary interpreters tend to accentuate the fundamental "Cartesian error"<sup>11</sup> and to underplay the innovative approach to the passions expounded in Descartes' last work, *Les Passions de l'âme* (1649), where his dualism is considerably attenuated.

My thesis claims that Descartes inaugurates a new trend in this field,<sup>12</sup> and that his ideas are, in fact, a necessary condition for, and the primary source of, today's scientific approach. This is not at all obvious: my argument needs to be illustrated by texts, methodology, and language. A "passionate" Descartes appears, at first sight, unusual and inappropriate: I will try to define a new perspective on him regarding our topic.

Descartes was encouraged to test his scientific outlook in this field by a woman, the Bohemian Princess Elisabeth, who, from 1643 to 1649, carried out a very stimulating epistolary relationship with the philosopher<sup>13</sup>. Her correspondent was immediately impressed by the accuracy of her objections to some key concepts of his own philosophy. The crucial question, addressed in her first letter of May 1643, is, of course, the mind-body problem. Following rigorous Cartesian logic, she found the affirmation that an immaterial substance (*res cogitans*) could move a material substance (*res extensa*) – or vice versa – without touching a surface (as occurs in the world of bodies), contradictory.<sup>14</sup> You could only change the direction or speed of a body if you struck it directly – given the absence of void in the Cartesian world. How could a passion felt in the soul produce and rule the movements of the muscles? I would prefer to conceive the soul as material,<sup>15</sup> she insisted in a second letter, rather than contradict all the principles of the new philosophy. Descartes is clearly embarrassed by this incisive objection, but his answer shows a deep awareness of the real connection between the two substances, beyond stereotypes:

Your highness observes that it is easier to attribute matter and extension to the soul than to attribute to it the capacity to

move and be moved by the body without having such matter and extension. I beg her to feel free to attribute this matter and extension to the soul because that is simply to conceive it as united to the body.<sup>16</sup>

In an apparently oversimplified but not inconsistent argument, he had stated in a previous letter that we have to consider a third "primitive notion" in addition to those of the two substances: their union, a notion that does not need to be demonstrated because «it can be understood only through itself».<sup>17</sup> We human beings are living evidence that the soul is not a ghost in the machine or a pilot in a ship, as he wrote in the *Meditations*: «I am very closely joined and, as it were, intermingled (*quasi permixtum*) with it [my body], so that I and the body form a unity».<sup>18</sup> In the thirtieth article of *Les Passions de l'âme* he writes:

But in order to understand all these things more perfectly, we need to recognize that the soul is really joined to the whole body, and that we cannot properly say that it exist in any one part of the body to the exclusion of the others. For the body is a unity, which is in a sense indivisible because of the arrangement of its organs, these being so related to one another that the removal of any of them renders the whole body defective.<sup>19</sup>

In his last work this perspective is explicit, but we can already find some hints of it in the *Regulae ad directionem ingenii*, written before 1629,<sup>20</sup> and in the *Principia Philosophiae*, published in 1644: it is not easy to demonstrate that he was a spiritualist, who considered the mind a disembodied entity. Even in the famous passages of the second and third Meditation in which he demonstrates the existence of the *cogito* independent of the *res extensa*, the real distinction between body and mind presupposes the possibility of a clear definition of the body.<sup>21</sup> The hypothetical way in which the *cogito* is demonstrated

implies a continuous reference to the world of the body, towards which our way of thinking inclines. The conclusion of the sixth Meditation – with the demonstration of the effective existence of external bodies and consequently the reliability of our sensory perception – appears, following recent interpretations, to be the real, but dissimulated, aim of the whole work.<sup>22</sup> Descartes' interest in science, i.e. in the world of bodies and their mechanisms, is evident even in the *Meditations*, the treatise that has been the basis for most spiritualistic interpretations of Descartes' thought. His scientific attitude is, naturally, *a fortiori* evident in his works in this area: *l'Homme*, for instance, and, of course, *Les passions de l'âme*.

This is also why, in his answer to the prefatory letter<sup>23</sup> to the latter work, he writes that he will not deal with the passions as a moral philosopher or as a rhetorician (in the Aristotelian tradition), «but as a natural philosopher (*en physicien*)».<sup>24</sup> Descartes intended to analyze the passions from a scientific perspective, moving away from the traditional, purely “humanistic”, approach, taking into account the crucial role played by the body in the mechanism of the passions. This is a decisive turning point, which affects not only the content of the treatise, but also the Cartesian lexicon: the word *emotion* is used here for the first time to define passion,<sup>25</sup> a choice that also had a significant impact on the subsequent English-speaking tradition.

The conceptual theological overtones of the word “passion” are avoided if the word “emotion” begins to be employed, as it occurs in Hume's works, after his period of study in France.<sup>26</sup> “Passion”, and “affection”, were traditionally used in moral and theological contexts and often carried a negative connotation: they referred to behaviors in which the soul played a passive role. Aquinas considers passivity as potentiality, and therefore as imperfection, a deficiency that precisely measures the distance from God and from perfection.<sup>27</sup> The world of the passions is based on the tenth Aristotelian category, pas-

sivity, or the state of being acted upon. Aquinas particularly emphasizes that the most proper sense of passion is recognizable in its being dragged, and in its receding from what is suitable to it.<sup>28</sup> Nevertheless, his attitude towards the passions is not completely condemnatory, as is that of the Stoics:<sup>29</sup> when ruled and directed by reason, the passions, as motions, can increase the value of individual human actions.<sup>30</sup>

Despite the fact that tradition and modernity share some basic concepts, the significance of these concepts, shaped by new contexts, is frequently very different to previous meanings. It is important to stress that the word “emotion”, derived from the French “*émotion*”, is usually employed in scientific contexts, with a more neutral connotation, in which the explanation of its mechanism is the primary focus. “Emotion” is not immediately linked to passivity: its motion does not necessarily imply that it is being dragged, nor is it inevitably heading for the worse. An “emotion” can be explained through its causes and effects and physical and psychological processes; taking into account the relationship between the body and its viscera, the brain processes and the corresponding ideas in the mind. Descartes and Aquinas share a conception of the passions as motions, but its connotation has changed: in the Cartesian treatise the conceptual pair activity-passivity does not refer to contradictory behaviors, but to the same entity, differently named, according to the subject to which it is related.<sup>31</sup> The role of passivity has weakened considerably. Passions are defined as follows:

[...] those perceptions, sensations or emotions of the soul which we refer particularly to it, and which are caused, maintained and strengthened by some movements of the spirits.<sup>32</sup>

They are caused by the movement of the animal spirits (the subtlest and fastest part of the blood), which produces – and also maintains and strengthens – them, in order to pre-

serve the body and to improve its perfection.<sup>33</sup> From the body to the body: this is the logic of the Cartesian passions. Their presence lasts in time and increases energy levels, their positive function is explicitly stressed:

From what has been said it is easy to recognize that the utility of all passions consist simply in the fact that they strengthen and prolong thoughts in the soul which is good for the soul to preserve and which otherwise might easily be erased from it.<sup>34</sup>

They are the necessary condition for the preservation and well-being of the body: without their swift informative reactions, we are defenseless in the face of danger. They play an essential role in maintaining the general balance of the whole organism, including its mind. They do not threaten reason: on the contrary, they help man to acquire an adequate knowledge of the world. In formulating this definition Descartes states that it is meaningful to call the passions "emotions" because they shake (*esbranlent*)<sup>35</sup> the soul, producing a change in the interior landscape, but not necessarily undermining its stability: an emotion signals the internal effect of an external event that has previously either helped or harmed the body.<sup>36</sup> Using the contemporary lexicon we could call them adaptive changes elicited by an alteration in the environment, phenomena that require an internal adjustment to external dynamics. It is indeed surprising that Descartes can still be crudely labeled a "dualist".<sup>37</sup>

Unlike Aristotle, Descartes believed that the passions are felt in the soul, but the heart is also involved, as testified by the numerous spirits and the quantity of blood that support the persistence of passions among our thoughts. This is the second reason why we call them emotions.<sup>38</sup> We can only metaphorically affirm that passions are felt in the heart, since their seat is the soul – or mind: but the mechanical explanation based on the movement of the spirits allows him to affirm that we can feel them "as if" they were in the

heart.<sup>39</sup> This shift from heart to soul, and the brain activity of which Descartes also speaks, make up another element of the paradigm shift introduced by Descartes towards a scientific rather than moral or rhetorical approach to the passions.

Further traces in a direction moving towards contemporary "feeling", or "Jamesian" theories, can be found in a passage in which Descartes emphasizes that the movements of the spirits in the nerves (for instance in the legs in flight) and the change in the pineal gland are simultaneous, and therefore allow the soul to feel and perceive <this action. In this way, the body may be moved to take flight by the mere disposition of the organs, without any contribution of the soul>.<sup>40</sup> Both cognitive value and the relevance of feeling are stressed in a way that is far from "obsolete".

### A unitary and "embodied" conception of mind

Nevertheless, the traditional interpretation is not devoid of all value. In order to reinforce his proposal's discontinuity with tradition, Descartes states clearly in the first line of his work:

Next I note that we are not aware of any subject with acts more directly upon our soul than the body to which it is joined. Consequently we should recognize that what is a passion in the soul is usually an action in the body. Hence there is no better way of coming to know about our passions than by examining the difference between the soul and the body, in order to learn to which of the two we should attribute each of the functions present in us.<sup>41</sup>

Interaction between body and mind does not deny their conceptual distinction. Here, too, the distance from both Antiquity and the Middle Age is evident:

For there is within us but one soul, and this soul has within it no diversity of

parts: it is at once sensitive and rational too, and all its appetites are volitions.<sup>42</sup>

The unitary conception of the soul defended by Descartes explicitly denies both the classical and Medieval conception according to which the soul is divisible into hierarchically ordered parts or functions: nutritive, sensitive, rational, each with different values. Within this conceptual context passions pertain to the sensitive function: they are by nature subordinate to reason. On the contrary, according to Descartes, the functions of the “lowest” powers (e.g. movement, pain, pleasure) are mechanically explained as bodily phenomena, while the faculties of the mind (intellect, imagination, perception, will, and passions) are unified as conscious *thoughts*, and therefore have direct access to each other.<sup>43</sup> This means that passion and reason are not hierarchically ordered: as thoughts, they share the same ontological status and can thus be considered to be on the same level, although the passions do not provide clear and distinct knowledge of the world.

As perceptions, the passions allow practical information that can be usefully employed to help us orient ourselves in the world. Therefore, by nature they play a positive role, although they may be excessive and even partially deforming, like magnifying lenses.<sup>44</sup> Nevertheless, they never pose a threat to reason. Descartes is very keen on this view of the practical, but cognitive, function of the passions, the way in which they serve as useful tools and can lead us in the right direction, towards benefit, or away from external danger. In cases where, as obscure and confused perceptions, the passions mislead us, reason can master them. This does not imply that the body’s role is secondary, indeed, it remains decisive, given the psycho-physical character of the passions. What we have is a new, non-hierarchical conception of the mind which allows a different cognitive evaluation of the passions and, therefore, a different role of them in a more general perspective.

Now that we are acquainted with all the passions, we have much less reason for anxiety about them than we had before. For we see that they are all by nature good, and that we have nothing to avoid but their misuse or excess.<sup>45</sup>

The unity of the soul is one of Descartes’ most important innovations: everything we think or feel, every content of our mind, is an idea. Whether clear or confused, more or less reliable, it is always a piece of information, and can be judged as such, according to its degree of clarity. A content of mind is, by its nature, to be evaluated from an epistemological and not from an ethical point of view. Its function is to interpret the world. As a consequence, the passions can no longer be considered the irrational part of the soul: they have cognitive value, and are a precious resource for our practical reason, not alien and uncontrollable powers to be restrained or eradicated, not the dangerous powers of a corrupt nature, not rebels to tame. They belong to the realm of intelligent thought, as in the recent “appraisal theories”. This is a radical and irreversible turning point in the modern conception of the passions: Spinoza will be deeply influenced by it, and the subsequent English tradition owes more to it than is generally recognized.

The mind in this new perspective is to be distinguished from the mechanical explanation of the body as extended matter, but, as already underlined, must not be considered as separate from it. When Descartes addresses the issue of the relations between passions, memory, imagination, intellect and will, this point is crystal clear. Remembering that the passions are caused by animal spirits, we need to answer a fundamental practical question: what can be done when they are dysfunctional? Flight is not always the appropriate reaction to danger. Fear protects us, but sometimes we need the courage to resist and attack. We know that our will cannot influence the passions directly, or instantly change an undesirable reaction. Descartes’

explanation of the mechanics of memory and of the role of habit plays a crucial role in this context. No power of the mind can be considered to be completely independent from the mechanism of the body: not even the intellect, whose "purity" is directly linked to the mechanism of vision: «It is the soul which sees, and not the eye, and it does not see directly, but only by means of the brain»<sup>46</sup> he says in the *Dioptrique*: there is no vision in the soul without body, and there is no intellect intuition without vision. Sensory intuition is a necessary, though not sufficient, condition for the intellect. In *L'homme*, Descartes explains the mechanisms of the five senses, memory, the passions and of ideas themselves on the basis of the activity of the brain:

For I wish to apply the term "idea" generally to all the impressions, which the spirits can receive as they leave the gland H [the pineal gland]. These are to be attributed to the "common" sense when they depend on the presence of objects [...] Here I could add something about how the traces of these ideas pass through the arteries to the heart, and thus radiate through all the blood.<sup>47</sup>

There can be no doubt about the embodied cognition that all intellectual processes presuppose in Descartes: many scholars recognize it today.<sup>48</sup> The purity of reason is explicitly affirmed in the *Meditations*, when Descartes, who is addressing theologians, needs to demonstrate the immortality of the soul and the existence of God. But in the sixth meditation, when he finally demonstrates the existence of external, physical things, the primary role of the body reappears. The faculty of sensory perception is passive, i.e. it receives ideas of sensible objects from another substance, a corporeal nature, which «contains formally [and in fact] everything which is to be found objectively [or representatively] in the ideas produced by this faculty [...] They may not all exist in a

way that exactly corresponds with my sensory grasp of them, for in many cases the grasp of the senses is very obscure and confused».<sup>49</sup>

Corporeal substance formally (Descartes uses here scholastic terminology) contains in its nature that which ideas express representatively. Although they do not resemble each other – since our mind is not a mirror of the corporeal object – body and mind are two directly linked substances, in both their origin and their everyday functioning. The refutation of the metaphor that paints the soul as a pilot in a ship follows here: the union of body and mind is unquestionable.<sup>50</sup> The mechanisms of imagination and memory are directly linked to the body and it is through these connections that the passions can be acted upon and pointed, when necessary, in a more functional direction. Memory is first of all a movement of the pineal gland towards the parts of the brain that contain the traces left by an object we want to remember. These traces consist only in the tendency of the pores to be opened along the route where the spirits have previously made their way. They are more apt to be opened again «in the same way when the spirits again flow towards them».<sup>51</sup> The mechanism of imagination works similarly, opening new pores, or new combinations of pores, in a new part of the brain. A habit is a constant connection between the movement of the gland and a thought and therefore if we want to act upon our passions the will must change this connection.

Using an analogy with sight, Descartes states that it is not sufficient to want to produce an adjustment in our eyes in order to look at a distant object: if we think about enlarging our pupils, nothing happens, while the pupils simply enlarge of their own accord if we want to see into the distance. Likewise, «in order to arouse boldness and suppress fear in ourselves, it is not sufficient to have a volition to do so»:<sup>52</sup> we have to change a mechanism based on memory and habit.

Since passions are perceptions, they can only be changed indirectly, bringing about a



movement in the pineal gland in a manner that «produces the effect corresponding to its volition».<sup>53</sup> Since they are emotions, they are accompanied by some «disturbances that take place in the heart and consequently also throughout the blood and in the animal spirits»<sup>54</sup> that cannot immediately be brought under control or changed. Only some secondary effects can be produced immediately: for instance, we can restrain a hand rising in anger, but cannot completely control the accompanying emotion.

Imagination and attention to the cause and effects of a passion are helpful, but exercise, which aims to induce a new and suitable reaction to an emotionally significant event, is crucial. However, the potential problem of conflict in the soul arises immediately. Since Descartes insists that there is within us but one soul, with no parts, it is difficult for him to provide a consistent explanation for any conflict between will and passion. The explanation he does provide is hyper-mechanistic: the pineal gland is physically pushed in opposite directions; the conflict (felt in the soul) between fear and boldness results from the different movements of the spirits in the brain and muscles. These movements led some philosophers to imagine two different, conflicting powers. In fact, the will attempts to control this physical opposition and to reorient it in the desired direction. This is the only way to change our attitude towards any stimulus that can elicit an emotional response.

Habit plays an ambivalent role: it consolidates our initial appropriate – today we might say adaptively positive – reactions to external events, but it can also strengthen bad or dysfunctional responses, which may threaten our internal balance. As soon as we are born, nature links every single movement of the pineal gland with a thought: this explains Descartes' incessant struggle against the enormous (although unperceived) influence of our childhoods on our intellect and will, signs of which are found throughout his work. His mechanical philosophy does not produce puppets. Habits can be changed: the

technique of *dressage* is a well-known example of this. If we can train (*dresser*) a horse to ignore its instincts, it is clear that such training will be much more effective with human beings. Even though animals do not have a soul, and therefore cannot have passions, says Descartes, the spirits and the gland (and consequently their muscles) all move within them, and they can thereby react actively to emotionally significant events.<sup>55</sup> The *dressage* can change the path of the spirits in the brain through the constant repetition of a mechanical task that leads to a new and suitable connection between spirits and thoughts. He adds that the same result can also be achieved through an immediate reconditioning: a disgusting association with something we used to like very much can quickly produce a definitive distance from that thing. Conclusion:

Even those who have the weakest souls could acquire absolute mastery over all passions if we employed sufficient ingenuity (*industrie*) in training (*dresser*) and guiding (*conduire*) them.<sup>56</sup>

## Classifying

The first part of the treatise deals with the nature, causes and effects of the passions, which are classified according to their emotional salience, and to whether they can harm or benefit us, whether or not they are suitable (*convenable*), useful (*utiles*) or noxious for our well-being. As we will see, the whole Cartesian classification is based on this strongly connoted lexicon. The subjectivity of its criterion marks an evident discontinuity with both Antiquity and the Middle Ages and inaugurates a new research path, followed by Hobbes, Spinoza, Hume, and many others.

Subjective does not mean, in this context, individual: the Cartesian approach is eminently universalistic. There is no space here for linguistic, anthropological or epistemic differences, in the style of contemporary cross-cultural research: the relevance of the

origins of concepts and the various ways of expressing them, currently considered so important – although debated by some in the field – for the understanding of emotions, are completely ignored here. Universality was common sense at that time, nor has it been abandoned today, even though it is no longer assumed without discussion.

In the general Cartesian analytic method, the first task is to identify an order. For classification purposes an enumeration of the passions, *le dénombrement*, is necessary. This corresponds to the fourth rule of the method and generally plays a controlling role, ensuring that no step is skipped and that the continuity of a particular order is guaranteed. The order is genealogical, established by the analytical method itself, which is a method of discovery, showing how the thing in question has been found.<sup>57</sup> Therefore, the first passion to be considered is not the most significant from an ethical point of view, but the one that leads us to the first encounter with an unknown object. At the beginning of our understanding of the world is wonder (*admiration*).<sup>58</sup> When we are surprised by an unknown phenomenon, which may be either beneficial or harmful, we are astonished by it, and concentrate upon it in order to form a clear and distinct idea of it, for practical reason.

The introduction of wonder marks an absolutely radical departure: none of the traditional classifications contained it. And yet it today appears, as surprise, in all current classifications. The subjectivity of Descartes' criterion requires that the first step to be made in assessing whether something is good or bad for us is to establish a relationship, to get in touch with the new object, to experience its influence upon us. With the same epistemic attitude that compels him to eliminate the Aristotelian categories, he renounces any objective ethical hierarchy: in order to orient ourselves in practical life we need direct experience of possible benefits or damages. Since the concepts provided by the analytical method are few and simple, the space left for what we need to know directly becomes

enormously expansive. This explains the close, but apparently paradoxical, connection between the abstract bodily machine presented in *L'homme* and Descartes' frequent visits to the butcher in order to deepen his direct knowledge of the body, and test his hypothesis. The highest level of abstraction is necessarily accompanied by the widest variety of experiences. The fact that English empiricism was deeply inspired, in original ways, by Descartes' philosophical innovations, is no coincidence.

Once we have experienced the practical meaning of an object, we can easily make judgements about it and distinguish the beneficial (which we love) from the harmful (which we hate). From this basic polarity, all other passions can be derived. Given the importance of time, Descartes writes, and the fact that passions are usually future-oriented,<sup>59</sup> desire comes next, before joy and sadness, which derive from the consideration of a present good or evil and arouse positive or negative feelings in us.

These are the six primitive passions, and all the others originate in them.<sup>60</sup> Descartes always strives for simplicity, another factor which distances him from tradition. He considers the distinction between the concupiscible and the irascible part of the sensory appetite to be valueless: if the soul is not divided into parts, desire and anger have no classificatory role. While Aquinas' classification is based on the distinction between the concupiscible and the irascible part of the soul, and identifies the most relevant passions, the Cartesian is based on the simple ones: the primitive passions are the basic genera from which all other species can be derived. Hope, despair, courage, fear, and anger – the five irascible passions – traditionally linked in a complex way to the vices and virtues – lose their importance and are simply classified as specifics.<sup>61</sup> Spinoza will radicalize this Cartesian simplicity, claiming that the classification of the passions can be based solely on desire and its possible degrees towards more or less perfection (joy and sadness), from

which all the rest, in various combinations, follow. The main theoretical aim is to gain scientific, i.e. geometrical, knowledge of the passions. We can classify them as, for example, triangles or storms, leaving aside any ethical evaluation. This does not mean that they do not have a significant ethical role, rather they are not vices or virtues by nature.

The need to differentiate the primary from the other passions originates in Antiquity, with Aristotle and the Stoics, and is still controversial in contemporary research. Classification provides helpful tools with which to pursue scientific knowledge that can enable us to formulate practical guidance for daily life. It is currently based mainly on the measurement of the neural activity elicited by the emotions, and on the latter's external expression, but methods for identifying and quantifying primary and derivative emotions, and how they can be cross-culturally assessed, are questions still subject to lively scientific debate.<sup>62</sup>

His analysis of external expressions is another remarkable achievement of Descartes' treatise. Although the topic was not new, nobody before him had devoted such deep, focused attention to the external signs of the passions and their bodily mechanism. On this question, simplicity was hard to attain:

For it [the expression] consist of many changes [...] and these are so special and slight that we cannot perceive each of them separately, though we can easily observe the result of their conjunction.<sup>63</sup>

Classification seems a hard, even impossible, task. Nevertheless, the Cartesian account of the expressions is particularly interesting. Despite the limited knowledge of the central and autonomous nervous systems available to the science of that epoch, he clearly understood the significance of immediate and uncontrollable reactions, such as changes in color, trembling, listlessness, fainting, tears, and laughter. As William James would later state: they are automatic responses to a stimulus and cannot be disguised.

Their basic physical mechanism, a sequence of vasodilatation and vasoconstriction, is easily explained. According to Descartes, the fact that these reactions do not depend directly on the muscles or nerves, but rather on the heart,<sup>64</sup> means that the speed, abundance, and intensity of blood flowing towards or away from the face and bodily extremities, can explain most of the phenomena. Blushing and turning pale are thus easily explained, as are trembling, fainting, listlessness, tears, and laughter. Blood coming from the arterial vein causes the muscles and the lungs either to swell or to empty, pushing the diaphragm, moving other internal organs and causing facial and bodily changes.<sup>65</sup> This is a very naïve account, although it was at the cutting edge of contemporary knowledge. Nevertheless, Descartes' principle, connecting the dynamics of the nervous system – which rules the movement of the spirits around the heart – to the expressions, does not contradict the most recent observations on the cortical activity elicited by emotions and accompanying their expression. Its consequence is of great importance:

Regarding this, it must be observed that they [the passions] are all ordained by nature to relate to the body, and to belong to the soul only in so far it is joined to the body. Hence, their natural function is to move the soul to consent and contribute to actions, which may serve to preserve the body or render it in some way more perfect.<sup>66</sup>

This explanation of the expressions is typical of the Cartesian attitude towards the mind-body link. Expressions are muscle movements, which are to be interpreted as visible signs of the passions. Even though tears do not "resemble" sadness, and the mechanism of their production has nothing to do with "feeling sad", we are capable of "reading" them as signs of a psychological event in an unprecedented unity of body and mind. According to Descartes, it cannot be

said that the products of a gland, i.e. tears, share the same nature as sadness: the tears are only the external signs of the passion, in the same way words indicate things without mirroring them.<sup>67</sup> We can analyze the external expression of the passions in order to identify some rules for the combination of signs which can provide us with a sort of logic of forms, a key to define a stylized, simplified “alphabet”, useful for deciphering how emotions are expressed in different contexts. In 1668, the French painter Charles Le Brun gave a lecture – eclectically based both on Cartesian philosophy and on Marin Cureau de la Chambre’s treatises on the passions – in which he presented a series of drawings and diagrams demonstrating how to paint and classify expressions. This series became a point of reference not only for painters, but also for many scholars, including Darwin.<sup>68</sup>

Within the contemporary debate, expressions are considered necessary features of all emotions. According to the standard model, we cannot speak of an emotion without a codified “face”, together with a specific neural activity, a subjective feeling, and an instrumental action. A face is a mobile combination of parts that can be interpreted as a representation of a primary emotion, such as surprise, disgust, anger, fear, sadness, or joy, as in Ekman’s classification, which is both a very useful tool with which to interpret the external attitude of individuals and a simplified schema to help us to understand emotions. Alternatively, it is possible to identify the role of each part of an expression: the width of a smile, or the height of an eyebrow, may be considered a stable sign of a feeling that is not ascribed to a single emotion and that provides us with a more sophisticated and cross-culturally recognizable method. According to this view, some of the basic components of facial expressions can be considered in their universal semantic meaning (for example “corners of the mouth up” cross-culturally means “I feel something good now”), unlike in the interesting but questionable standardization of facial expressions ad-

vanced by Paul Ekman. This approach avoids denoting emotions with specific words, such as “fear”, “anger”, or “disgust”, which do not always have direct counterparts in all cultures and languages.<sup>69</sup>

The current debate is rich in epistemological questions, and benefits from numerous laboratory experiments that were impossible in the Seventeenth century, but the question of “reading faces” as a scientific issue started with Descartes and has a long history. Darwin’s *The Expression of Emotion in Men and Animals* – the legacy of which is today disputed by scholars<sup>70</sup> – is obviously a milestone, but the importance of the scientific paradigm shift initiated by Descartes is remarkable. And too often forgotten.

## Conclusions

As I have tried to show, Descartes’ innovative approach to the emotions should not be considered “obsolete”. His scientific style, his re-evaluation of the role played by the body in all kinds of knowledge, including the passions, and their cognitive value, classification and expression, are significant elements of his scientific philosophy that are still relevant today. It is important not only to remember the historical origins of our conceptions, but also to take into account the influence of some key concepts. The great thinkers, notwithstanding the limited instruments available to them, can still provide us with a significant phenomenology of this field which will – it is hoped – extend the value of contemporary scientific research beyond the laboratory and bring about a greater awareness of its broader philosophical significance.

## Notes

<sup>1</sup> Regarding some of the essential features of the current international debate on affective sciences see R. DE SOUSA, “Emotion”, in: E.N. ZALTA (ed.), *Stanford Encyclopedia of Philosophy*, first published February 3th, 2003; substantive revision January 21th, 2013. See also W. REDDY, *The Navigation of Feeling. A*

*Framework for the History of Emotions*, Cambridge University Press, Cambridge 2001; M. LEWIS, J. HAVILAND-JONES, L. FELDMAN BARRETT (eds.), *Handbook of Emotions*, Guilford Press, New York 2008; P. GOLDIE (ed.) *The Oxford Handbook of Philosophy of Emotion*, Oxford University Press, Oxford 2010; J. PLAMPER, *The History of Emotions. An Introduction*, Oxford University Press, Oxford, 2015.

<sup>2</sup> W. JAMES, *What is an Emotion?*, in: «Mind», vol. IX, n. 34, 1884, pp. 188-205, here p. 189-190.

<sup>3</sup> This terminology was first introduced by M. Arnold (see M. ARNOLD, *Emotion and Personality*, Columbia University Press, New York 1960).

<sup>4</sup> See, among others, R. SOLOMON, *The Passions. Emotions and the Meaning of Life*, Doubleday, New York 1976; R. DE SOUSA, *The Rationality of Emotions*, MIT Press, Cambridge (MA) 1987; M. NUSSBAUM, *Upheavals of Thought. The Intelligence of Emotions*, Cambridge University Press, Cambridge 2001; K.R. SCHERER, A. SCHORR, T. JOHNSTONE (eds.), *Appraisal Processes in Emotion: Theory, Methods, Research*, Oxford University Press, Oxford 2001.

<sup>5</sup> See S.S. TOMKINS, *Affect Theory*, in: K.R. SCHERER, P. EKMAN (eds.), *Approaches to Emotion*, Erlbaum, Hillsdale (NJ) 1984, pp. 163-195; P. EKMAN, R.J. DAVIDSON (eds.), *The Nature of Emotion: Fundamental Questions*, Oxford University Press, Oxford 1994.

<sup>6</sup> The first work in this direction was P. EKMAN (ed.), *Darwin and the Facial Expression*, Academic Press, New York/London 1973.

<sup>7</sup> See P. EKMAN, D. CORDARO, *What Is Meant by Calling Emotions Basic*, in: «Emotion Review», vol. III, n. 4, 2011, pp. 364-370.

<sup>8</sup> M.Z. ROSALDO, *Knowledge and Passion: Ilongot Notions of Self and social Life*, Cambridge University Press, Cambridge 1980; C. LUTZ, *Unnatural Emotions: Everyday Sentiments on a Micronesian Atoll and Their Challenge to Western Theory*, University of Chicago Press, Chicago 1988; A.J. FRIDLUND, *Human Facial Expression: An Evolutionary View*, San Diego Academic Press, San Diego 1994.

<sup>9</sup> For this position see L. FELDMAN BARRETT, J. RUSSELL (eds.), *The Psychological Construction of Emotion*, The Guilford Press, London/ New York 2015.

<sup>10</sup> See the original and well-argued analysis by A. WIERZBICKA, *Emotions across Languages and Cultures: Diversity and Universals*, Cambridge University Press, Cambridge 1999.

<sup>11</sup> The excellent book A. DAMASIO, *Descartes' Error. Emotion, Reason and the Human Brain*, Putnam

Son's, New York 1994 is unfortunately based on an oversimplification of Descartes' philosophy.

<sup>12</sup> About the context in which Descartes' work originated see the classical book by A. LEVY, *French Moralists. The Theory of the Passions 1585 to 1649*, Clarendon Press, Oxford 1964, and, more recently, C. TALON-HUGON, *Descartes. Les passions revêues par la raison. Essay sur les theories des passions de Descartes et quelques-uns des ses contemporaines*, Vrin, Paris 2001.

<sup>13</sup> Descartes' interest in the passions is evident from his very first writings: from the *Cogitationes privatae* (R. DESCARTES, *Œuvres*, edited by C. ADAM, P. TANNER (eds.), Vrin, Paris, 1973-1978, vol. X, pp. 213-217), to the *Compendium musicae* (R. DESCARTES, *Œuvres*, cit., vol. X, pp. 79-141), to *L'Homme* (R. DESCARTES, *Œuvres*, cit., vol. XI, pp. 163-170), to the correspondence. However, it isn't until he begins his stimulating and challenging correspondence on the topic with Elisabeth that Descartes begins any systematic research into the passions and thereby applies his method to them.

<sup>14</sup> R. DESCARTES, *Œuvres*, cit., vol. III, p. 661.

<sup>15</sup> *Ivi*, p. 685.

<sup>16</sup> R. DESCARTES, *Œuvres*, cit., vol. III, p. 694 (En. trans. R. DESCARTES, *The Philosophical Writings*, edited by J. COTTINGHAM R. STOOHOFF, D. MURDOCH, Cambridge University Press, Cambridge 1985-1986, vol. III, p. 228).

<sup>17</sup> R. DESCARTES, *Œuvres*, cit., vol. III, p. 665 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., p. 218). For an original, analytical, discussion of the role of the third principle, not to be interpreted as a substance, but as a «fait qui s'impose», as the first and not the third principle, according to which the others can be better understood, see J.-L. MARION, *Sur la pensée passive de Descartes*, PUF, Paris 2013, pp. 135-176.

<sup>18</sup> R. DESCARTES, *Œuvres*, cit., vol. VII, p. 81 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 56). For a unitary conception of the mind-body relationship in Descartes see J.-M. BEYSSADE, *La classification cartésienne des passions*, in: «Revue Internationale de Philosophie», vol. CXLVI, 1983, pp. 178-187; G. CIMINO, *Teoria del sistema nervoso e ottica fisiologica in Descartes*, in: G. BELGIOIOSO, G. CIMINO, P. COSTABEL, G. PAPULI (eds.), *Descartes. Il metodo e i saggi*, Istituto dell'Enciclopedia Italiana, Roma 1990, pp. 241-272; G. RODIS-LEWIS, *L'anthropologie cartésienne*, PUF, Paris 1990, pp. 19-148; G. RODIS-LEWIS, *Descartes and the Unity of the Human Being*, in: J.

COTTINGHAM (ed.), *Descartes*, Oxford University Press, Oxford 1998, pp. 197-210; D. KAMBOUCHNER, *L'homme des passions: Commentaire sur Descartes*, Albin Michel, Paris 1995, Tome I, pp. 131-205; P. GUENANCIA, *L'intelligence du sensible. Essai sur le dualisme cartésien*, Gallimard, Paris 1998; C. SANTINELLI, *Mente e corpo. Studi su Cartesio e Spinoza*, Quattroventi, Urbino 2000; S. LANDUCCI, *La mente in Cartesio*, Angeli, Milano 2002; L. SHAPIRO, *The Structure of the "Passions of the Soul" and the Union of Soul and Body*, in: B. WILLISTON, A. GOMBAY (eds.), *Passion and Virtue in Descartes*, Humanity Books, New York 2003, pp. 31-79; G. HATFIELD, *The Passions of the soul and Descartes's Machine Psychology*, in: «Studies in History and Philosophy of Science», vol. XXXVIII, n. 1, 2007, pp. 1-35; E. SCRIBANO, *Macchine con la mente. Fisiologia e metafisica in Cartesio e Spinoza*, Carocci, Roma 2015.

<sup>19</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 351 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 338).

<sup>20</sup> The recent literature unanimously establishes 1629 as the *terminus ad quem*, but the period of composition is debated. See C. Adam in: R. DESCARTES, *Œuvres*, cit., vol. X, pp. 486-488, and J.-P. WEBER, *La constitution du texte des "Regule"*, Sedes, Paris 1964.

<sup>21</sup> For a detailed and innovative discussion of the subject from this perspective, see S. LANDUCCI, *La mente in Cartesio*, cit., particularly pp. 55-126.

<sup>22</sup> See F. HALLYN, *Descartes: dissimulation et ironie*, Droz, Genève 2006, pp. 108-171.

<sup>23</sup> The abbé Picot seems to be the author of the prefatory letter following the Adam-Tannery edition: see the *Avertissement*, in: R. DESCARTES, *Œuvres*, cit., vol. XI, pp. 296-97, but there is no definitive evidence.

<sup>24</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 326 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 327).

<sup>25</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 349 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 339).

<sup>26</sup> For this observation see T. DIXON, *From Passions to Emotions. The Creation of a Secular Psychological Category*, Cambridge University Press, Cambridge 2006, p. 108, an excellent analysis of the secularization of the idea of passion from antiquity to Charles Darwin and William James. On this significant lexical shift, and on the role of the pair action-passion in general, see the important

book by S. JAMES, *Passion and Action. The Emotions in Seventeenth-Century Philosophy*, Oxford University Press, Oxford 1997.

<sup>27</sup> T. AQUINAS, *Summa Theologiae, Prima pars Secundae partis, Quaestio 22*, art. 2, 1 resp.

<sup>28</sup> *Ivi*, art. 1, 1 resp. On this subject see the detailed analysis by R. MINER, *Thomas Aquinas and the Passions*, Cambridge University Press, Cambridge 2009, particularly pp. 32-45.

<sup>29</sup> *Ivi*, 24, art. 2, resp. 2 and 3, where he affirms that the passions do not necessarily deviate from the natural order, if guided by reason. When guided by reason, they are virtues, otherwise they incline to sin.

<sup>30</sup> See for this interpretation: R. MINER, *Thomas Aquinas*, cit., p. 88-96; D. PERLER, *Transformationen der Gefühle: Philosophische Emotionstheorien: 1270-1670*, Fischer, Frankfurt a.M. 2011, pp. 43-91.

<sup>31</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 328 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 327).

<sup>32</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 349, (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 338).

<sup>33</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 430, (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 376).

<sup>34</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 383 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 354).

<sup>35</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 350 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 339).

<sup>36</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 356 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 342).

<sup>37</sup> For this interpretation see A. DAMASIO, *Descartes' Error*, cit. Many scholars criticized this position: among others see G. KIRKEBØEN, *Descartes' Embodied Psychology: Descartes' or Damasio's Error?*, in: «Journal of the History of the Neuroscience», vol. X, n. 2, 2001, pp. 173-191; A.L. GLUCK, *Damasio's Error and Descartes' Truth. An Inquiry into Consciousness, Epistemology and Metaphysics*, University of Scranton Press, Scranton/London 2007; D. KAMBOUCHNER, *Emotions et raison chez Descartes. L'erreur de Damasio*, in: S. ROUX (ed.), *Les émotions*, Vrin, Paris 2009, pp. 83-102.

<sup>38</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 363 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 345).

<sup>39</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 353 (En.

trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 341).

<sup>40</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 358 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 343).

<sup>41</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 328 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 328).

<sup>42</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 364 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 346).

<sup>43</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, 342 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, 335). D. KAMBOUCHNER highlights this point (see D. KAMBOUCHNER, *L'homme des passions*, cit., pp.102-121) and S. JAMES, *Passion and Action*, cit. pp. 90-92.

<sup>44</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 431 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 377).

<sup>45</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, pp. 485-486 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 403).

<sup>46</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 141 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 172). On Descartes' optics see N.L. MAULL, *Cartesian Optics and the Geometrization of Nature*, in: S. GAUKROGER (ed.), *Descartes. Philosophy, Mathematics and Physics*, The Harvester Press, New Jersey 1980, pp. 23-40; A.I. SABRA, *Theories of Light. From Descartes to Newton*, Cambridge University Press, Cambridge 1981, pp. 17-135; W.R. SHEA, *The Magic of Numbers and Motion: The Scientific Career of René Descartes*, Science History Publications Canton (MA) 1991, pp. 156-170; J. SCHUSTER, *Descartes-Agonistes. Physico-mathematics, Method & Corpuscular-Mechanism 1618-33*, Springer, New York/London 2013, pp. 167-224.

<sup>47</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 177 (En. trans. *The Philosophical Writings*, cit., vol. I, p. 106).

<sup>48</sup> See, among others, D. GARBER, *Descartes Embodied. Reading Cartesian Philosophy through Cartesian Science*, Cambridge University Press, Cambridge 2001; E. ANGELINI, *Le idee e le cose. La teoria della percezione di Descartes* ETS, Pisa 2007; G. HATFIELD, *The Passions of the soul and Descartes's Machine Psychology*, cit.; E. SCRIBANO, *Macchine con la mente*, cit., pp. 13-76.

<sup>49</sup> R. DESCARTES, *Œuvres*, cit., vol. VII, p. 79 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. II, p. 55).

<sup>50</sup> R. DESCARTES, *Œuvres*, cit., vol. VII, p. 81 (En.

trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. II, p. 56).

<sup>51</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 360 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 344).

<sup>52</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 363 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 345).

<sup>53</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 360 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 343).

<sup>54</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 363 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 345).

<sup>55</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 369 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 348).

<sup>56</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 370 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 348). On Descartes, the mastery of passions and the sciences see G. CANZIANI, *Filosofia e scienza nella morale di Descartes*, La Nuova Italia, Firenze 1980; F. BONICALZI, *Passioni della scienza. Descartes e la nascita della psicologia*, Jaca Book, Milano, 1990, D. KAMBOUCHNER, *L'homme des passions*, cit., Tome II, pp. 7-146.

<sup>57</sup> On Descartes' analytic method, in connection to the current scientific discussion see J. HINTIKKA, U. REMES, *The Method of Analysis. Its Geometrical Origins and its General Significance*, Riedel, Dordrecht 1974. In a more specific mathematical context see M. OTTE, M. PANZA, *Analysis and Synthesis in Mathematics. History and Philosophy*, Kluwer, Dordrecht 1997. On the heuristic value of the analytical method see C. CELLUCCI, *Filosofia e matematica*, Laterza, Bari 2002, pp. 145-222, and G. ISRAEL, *Dalle Regulae alla Géométrie*, in: G. BELGIOIOSO, G. CIMINO, P. COSTABEL, G. PAPULI (eds.), *Descartes, il Metodo e i saggi*, Istituto della Enciclopedia Italiana, Roma 1990, pp. 441-474. On Descartes' analytic method compared to the *methodus resolutiva* see P. GIACOMONI, *Analisi. Jacopo Aconcio, ingegnere rinascimentale, René Descartes matematico moderno*, in: «Physis» (forthcoming).

<sup>58</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 373 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 350).

<sup>59</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 374 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 350).

<sup>60</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 380 (En.

trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 353).

<sup>61</sup> P. King brilliantly explains the difference observing that the classification model in Descartes is chemical in the sense that «they can be mixed and blended», while Aquinas' model is biological: «they are related causally rather than by mixture». P. KING, *Aquinas on Passions*, in: S. MACDONALD, E. STUMP (eds.), *Aquinas Moral Theory. Essays in Honor of Norman Kretzmann*, Cornell University Press, Ithaca/London 1998, pp. 101-132, here p. 113.

<sup>62</sup> A synthetic overview on the different positions within the current debate on classification in N. VALENTINI, F. FIORE, *Psicologicamente. Le teorie contemporanee*, in: P. GIACOMONI, *Ardore. Quattro prospettive sull'ira da Achille agli Indignados*, Carocci, Rome 2014, pp. 119-135.

<sup>63</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 412 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 368).

<sup>64</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 413 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 368).

<sup>65</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 419 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 371).

<sup>66</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 430 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 376).

<sup>67</sup> R. DESCARTES, *Œuvres*, cit., vol. XI, p. 3 (En. trans. R. DESCARTES, *The Philosophical Writings*, cit., vol. I, p. 81).

<sup>68</sup> On the philosophical sources and on the influence of this lecture and of the drawings on the subsequent science and art see J. MONTAGUE, *The Expression of the Passions: the Origin and the Influence of C. Le Brun's Conference sur l'Expression générale et particulière*, Yale University Press, New Haven 1994 (see pp. 156-162 for a list of the sources of the text).

<sup>69</sup> A. WIERZBICKA, *Emotions across Languages and Cultures*, cit., p. 14.

<sup>70</sup> See the articles by L. FELDMANN BARRETT, *Was Darwin Wrong about Emotional Expression?*, in: «Current Directions in Psychological Science», vol. XX, n. 6, 2011, pp. 400-406; L. FELDMANN BARRETT, *Psychological Construction: the Darwinian Approach to the Science of Emotion*, in: «Emotion Review», vol. V, n. 4, 2012, pp. 379-389, where, by presenting her position against Ekman's theory, the author considers the pivotal importance of Darwin's scientific legacy.